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New Species of the Genus *Clubiona* (Araneae, Clubionidae) from Iriomotejima Island, the Ryukyus

By

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Abstract The spiders of the genus *Clubiona* LATREILLE, 1804, obtained from Iriomotejima Island of the Ryukyu Archipelago, Southwest Japan, are classified into seven species. Of these, six are new to science and are described under the names, *C. ultramarina*, *C. cirrosa*, *C. ryukyuensis*, *C. viridula*, *C. insulana* and *C. tanikawai*; the remaining one is identified with *C. jucunda* (KARSCH, 1879), the only species previously recorded from this island. Judging from their morphological characteristics, especially the male and female genital organs, these species are not closely related to one another, but are derived from different origins, respectively.

Spiders of the genus *Clubiona* LATREILLE, 1804, are found under tree barks and stones as well as on foliage of shrubs and trees, and widespread in the world. The genus contains more than 350 described species mainly from the Holarctic Region (SIMON, 1932; REIMOSER, 1937; LOCKET & MILLIDGE, 1951; EDWARDS, 1958; WIEHLE, 1965; DONDALE & REDNER, 1982; ROBERTS, 1985). However, the spiders of the genus in the tropical regions have been very poorly studied. In Japan, about 30 species of *Clubiona* have been described from the main islands, Hokkaido, Honshu and Kyushu (BÖSENBERG & STRAND, 1906; YAGINUMA, 1986; etc.), but some of these were recorded from the Ryukyu Islands (SHIMOJANA, 1967).

Iriomotejima is one of the subtropical islands belonging to the Yaeyama Group of the Ryukyu Archipelago, Southwest Japan (SAITO *et al.*, 1973). Although the island has been known to abound in spiders of special zoological interest, their investigations remain unsatisfactory even at the present day, except for the family Thomisidae (ONO, 1988).

Recently, I obtained a good collection of the spiders of *Clubiona* from Iriomotejima Island, which was made by Mr. Akio TANIKAWA after his frequent collecting trips to the island since 1985. The specimens have been classified into seven species including *Clubiona jucunda* (KARSCH, 1879), the only species previously known from the island. The other ones seem to be not only new to the fauna of the island but also new to science. Thus, the six new species will be described in the present paper.

The abbreviations used in this paper are as follows: ALE, anterior lateral eye; AME, anterior median eye; PLE, posterior lateral eye; PME, posterior median eye.

Before going further, I wish to express my hearty thanks to Dr. Shun-Ichi UÉNO, National Science Museum, Tokyo, for critical reading of the manuscript of this paper,

and Messrs. Akio TANIKAWA, Noba High School, Kanagawa, and Seiji MATSUMOTO, Kyorin University, Tokyo, for their offering invaluable specimens.

Genus *Clubiona* LATREILLE, 1804

Clubiona ultramarina sp. nov.

[Japanese name: Aomi-fukurogumo]

(Figs. 1–7)

Measurements (in mm). Body length ♀ 2.86–3.04, ♂ 2.68–3.07; prosoma length ♀ 1.21–1.29, ♂ 1.29–1.50, width ♀ 0.93–0.95, ♂ 0.96–1.14; opisthosoma length ♀ 1.57–1.78, ♂ 1.38–1.59, width ♀ 0.82–1.00, ♂ 0.79–0.86; lengths of legs I–IV [total length (femur+patella+tibia+metatarsus+tarsus)]: ♀ (paratype), I 2.55 (0.75+0.37+0.68+0.45+0.30), II 3.11 (0.95+0.43+0.85+0.48+0.40), III 2.05 (0.55+

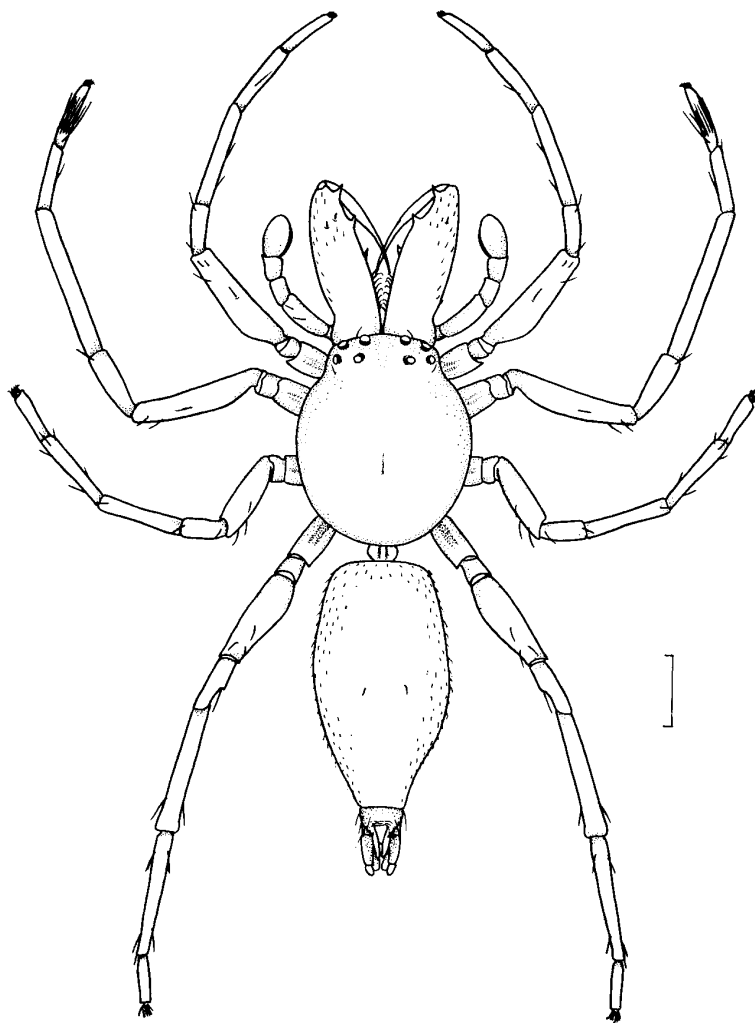
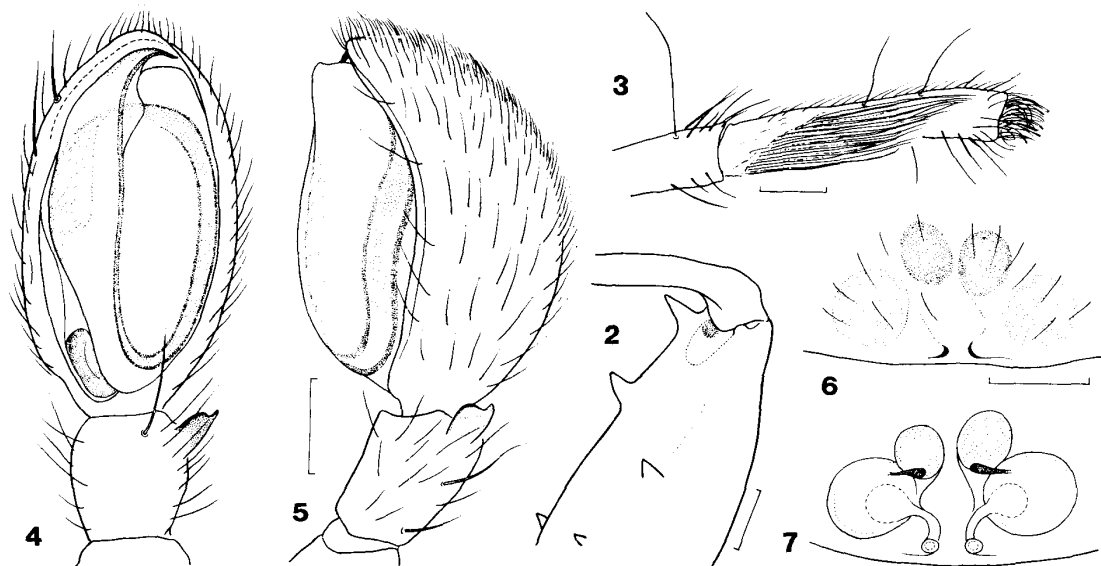


Fig. 1. *Clubiona ultramarina* sp. nov., habitus of male. (Scale: 0.5 mm.)



Figs. 2-7. *Clubiona ultramarina* sp. nov. — 2. Chelicera of male, ventral view. 3. Tarsus of leg II of male, prolateral view. 4. Male palp, ventral view. 5. Same, retrolateral view. 6. Epigynum. 7. Female genitalia, dorsal view. (Scales: 0.1 mm.)

0.30+0.43+0.52+0.25), IV 3.30 (0.93+0.43+0.77+0.86+0.31), ♂ (holotype), I 3.06 (0.88+0.45+0.83+0.60+0.30), II 3.70 (1.15+0.52+1.00+0.60+0.43), III 2.35 (0.73+0.33+0.52+0.52+0.25), IV 3.73 (1.05+0.45+0.90+0.98+0.35).

Prosoma. Lateral eyes slightly larger than medians, ALE/AME ♀♂ 1.14–1.20, PLE/PME ♀♂ 1.00–1.22, AME–AME/AME–ALE ♀♂ 1.80–2.50, PME–PME/PME–PLE ♀ 2.28–2.57, ♂ 2.10–2.50. Chelicera of male developed, dorsally with some short setae (Figs. 1–2), promargin of fang furrow with three strong teeth, retromargin with two teeth; chelicera of female normal, promargin with three teeth, retromargin without tooth. Tarsus of leg II furnished with peculiar scopula (Fig. 3). Metatarsus of leg I with 2 ventral spines; femur of leg I with 0–0–1–1 dorsal spines.

Male palp (Figs. 4–5). Tibia without strong spines; retrolateral apophysis small and digitiform. Tarsus ovate; bulb simple, without distinct tegular apophysis; embolus short and spiniform.

Opisthosoma long and slender, covered with very short hairs.

Female genitalia (Figs. 6–7). Epigynum not much sclerotized; intromittent orifices situated in the posterior part of epigynum and near epigastric furrow. Intromittent canal very short and curved; atrium globular, larger than spermatheca; spermatheca oval.

Coloration and markings. ♀♂ Prosoma light yellow to light greenish yellow, chelicerae, maxillae, labium, sternum, palps and legs light yellow, except for coxae of legs with sky-blue cores. Opisthosoma whitish or light greenish yellow, ventral side with sky-blue spots.

Type series. Holotype: ♂, Urauchi, Iriomotejima Island, Southwest Japan,

29–III–1989, A. TANIKAWA leg. (NSMT–Ar 2026); paratypes: 1 ♀, Komi, same island, 30–XII–1985, 2 ♀♀, Ôtomi, same island, 28–III–1986 and 30–XII–1986, 2 ♂♂, Haimida, same island, 4–I–1987, A. TANIKAWA leg., 1 ♂, Shirahama, same island, 19–VIII–1988, S. MATSUMOTO leg. (NSMT–Ar 2027–2031).

All the type specimens designated in this paper are deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Notes. This new species can be readily distinguished from all other species of *Clubiona* by having peculiar scopula on the tarsus of leg II. Both the male and the female genital organs of this species resemble those of *C. ericius* CHRYSANTHUS, 1967, described from New Guinea, but the embolus is longer and the intromittent canal is straight in the latter species. The pro- and opisthosomata of *C. ericius* are covered with many long hairs.

***Clubiona cirrosa* sp. nov.**

[Japanese name: Makihige-fukurogumo]

(Figs. 8–11)

Measurements (in mm). Body length ♀ 6.42, ♂ 3.93; prosoma length ♀ 2.64, ♂ 1.86, width ♀ 1.71, ♂ 1.29; opisthosoma length ♀ 3.57, ♂ 2.07, width ♀ 1.93, ♂ 1.00; lengths of legs I–IV [total length (femur + patella + tibia + metatarsus + tarsus)]: ♀ (paratype), I 5.23 (1.57 + 0.86 + 1.25 + 1.00 + 0.55), II 5.51 (1.61 + 0.89 + 1.36 + 1.07 + 0.58), III 4.76 (1.54 + 0.79 + 0.93 + 1.07 + 0.43), IV 7.61 (2.25 + 0.96 + 1.68 + 2.14 + 0.58), ♂ (holotype), I 4.12 (1.14 + 0.57 + 1.07 + 0.86 + 0.48), II 4.48 (1.25 + 0.64 + 1.20 + 0.89 + 0.50), III 3.46 (1.11 + 0.54 + 0.71 + 0.78 + 0.32), IV 5.85 (1.64 + 0.68 + 1.36 + 1.75 + 0.43).

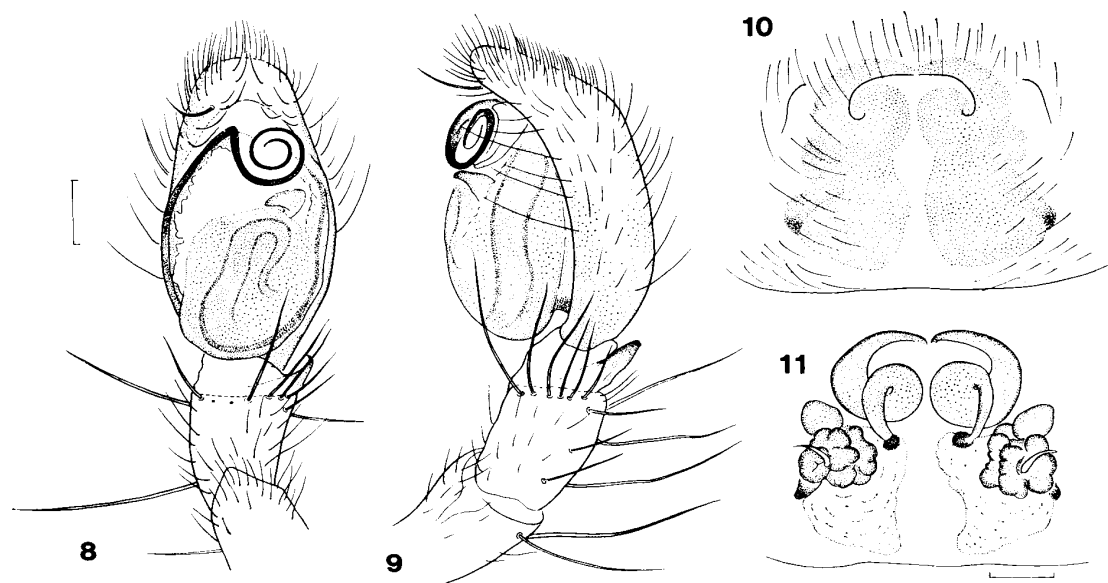
Prosoma. Eyes subequal in size, ALE/AME ♀ 1.00, ♂ 1.10, PLE/PME ♀♂ 1.00, AME–AME/AME–ALE ♀♂ 1.60–1.67, PME–PME/PME–PLE ♀ 1.78, ♂ 1.60. Chelicera normal in both the sexes, promargin of fang furrow with one large and two small teeth, retromargin with two small teeth. Metatarsus of leg I with 2–0 ventral spines; femur of leg I with 1–1–1 dorsal spines.

Male palp (Figs. 8–9). Tibia with many strong spines; retrolateral apophysis small and digitiform, apically curved. Tarsus ovate; bulb simple, with tegular apophysis digitiform and not developed; embolus filiform, long, distally winding.

Female genitalia (Figs. 10–11). Epigynum not much sclerotized, with intromittent orifices situated in the anterior part and distant from epigastric furrow. Intromittent canal winding; atrium bladder-like; spermatheca tube-shaped.

Coloration and markings. ♀♂ Prosoma dirty yellow, chelicerae dark brown, maxillae and labium yellowish brown, sternum, palps and legs light yellowish brown. Opisthosoma yellow or beige with many brown spots in the posterior part, ventral side yellowish white.

Type series. Holotype: ♂, Urauchi, Iriomotejima Island, Southwest Japan, 15–VIII–1988, A. TANIKAWA leg. (NSMT–Ar 2032); paratype: 1 ♀, Komi, same



Figs. 8–11. *Clubiona cirrosa* sp. nov. — 8. Male palp, ventral view. 9. Same, retrolateral view. 10. Epigynum. 11. Female genitalia, dorsal view. (Scales: 0.1 mm.)

island, 3–I–1989, A. TANIKAWA leg. (NSMT–Ar 2033).

Notes. *Clubiona cirrosa* belongs to the species-group represented by *C. corticalis* (WALCKENAER, 1802) (ONO, 1986 a) and bears close resemblance to *C. kurosawai* ONO, 1986 occurring in Honshu, Japan, but is distinguishable from the latter by the shape of embolus and tegular apophysis of male palp and intromittent canal of female genitalia.

The specific name of this new spider is derived from the shape of embolus of male palp.

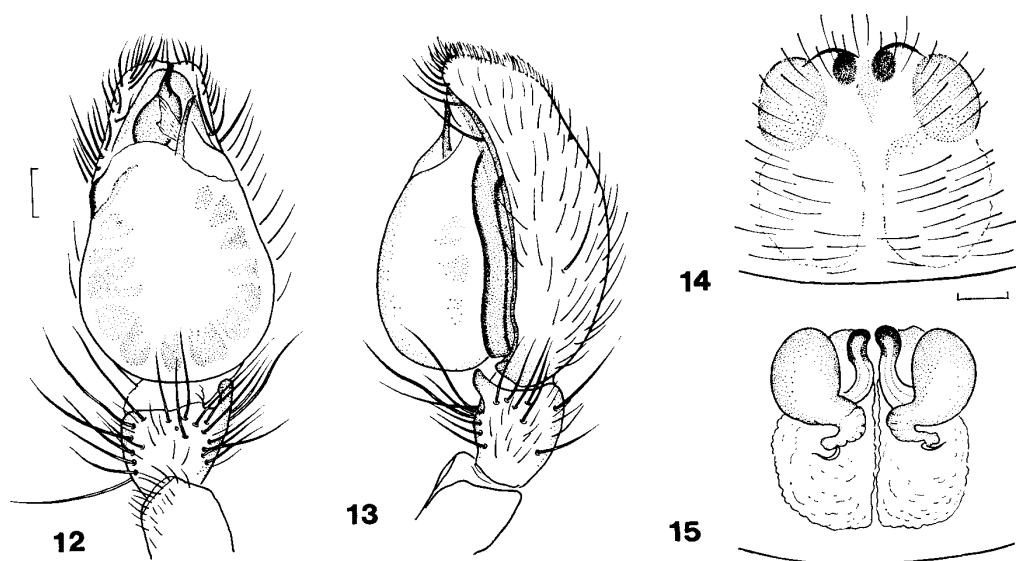
***Clubiona ryukyuensis* sp. nov.**

[Japanese name: Ryukyu-fukurogumo]

(Figs. 12–15)

Measurements (in mm). Body length ♀ 4.21–6.14, ♂ 3.57–4.93; prosoma length ♀ 1.93–2.43, ♂ 1.71–2.29, width ♀ 1.36–1.71, ♂ 1.25–1.64; opisthosoma length ♀ 2.14–3.79, ♂ 2.05–2.71, width ♀ 1.25–2.36, ♂ 1.11–1.50; lengths of legs I–IV [total length (femur+patella+tibia+metatarsus+tarsus)]: ♀ (allotype), I 4.16 (1.20+0.73+1.00+0.78+0.45), II 4.63 (1.33+0.73+1.17+0.90+0.50), III 3.60 (1.07+0.60+0.67+0.93+0.33), IV 5.30 (1.47+0.70+1.13+1.53+0.47), ♂ (holotype), I 4.75 (1.33+0.67+1.20+0.97+0.58), II 5.36 (1.53+0.77+1.40+1.03+0.63), III 4.09 (1.23+0.60+0.80+1.13+0.33), IV 5.80 (1.60+0.80+1.23+1.67+0.50).

Prosoma. Eyes: ALE/AME ♀♂ 1.25–1.44, PLE/PME ♀♂ 1.05–1.12, AME–AME/ALE ♀ 1.40–1.60, ♂ 1.75–2.00, PME–PME/PME–PLE ♀♂ 1.38–1.66.



Figs. 12–15. *Clubiona ryukyuensis* sp. nov. — 12. Male palp, ventral view. 13. Same, retrolateral view. 14. Epigynum. 15. Female genitalia, dorsal view. (Scales: 0.1 mm.)

Chelicerae of both the sexes normal, with 4–5 teeth on promargin of fang furrow, 3–5 minute teeth on retromargin. Metatarsus I with 2–0 ventral spines; femur I with 1–1–1 dorsal spines.

Male palp (Figs. 12–13). Tibia setaceous with retrolateral apophysis small and digitiform. Bulb large and expanded, with tegular apophysis and conductor; embolus thick and short, fig-shaped.

Female genitalia (Figs. 14–15). Epigynum not much sclerotized; intromittent orifices situated in the anterior part of epigynum. Intromittent canal short, extending in posterior direction; atrium a bladder organ, large and soft; spermatheca large, reniform.

Coloration and markings. ♀♂ Prosoma yellowish brown; chelicerae, maxillae and labium yellowish to reddish brown, sternum, palps and legs yellow to light yellowish brown. Opisthosoma beige without any marking, ventral side lighter.

Type series. Holotype: ♂, allotype: ♀, Ôhara, Iriomotejima Island, Southwest Japan, 30–XII–1986, A. TANIKAWA leg. (NSMT–Ar 2034–2035); paratypes: 3 ♀♀, same locality as for the holotype, 30–III–1986, 1 ♀, Ôtomi, same island, 28–III–1987, 1 ♀, Ôtomi, 30–III–1989, 2 ♀♀, Komi, 27–III–1987 and 6–VIII–1987, 1 ♂, Sonai, 1–IV–1986, 1 ♂, Shirahama, 27–XII–1987, 2 ♂♂, Urauchi, 1–IV–1989, A. TANIKAWA leg., 1 ♂, Urauchi, 18–VIII–1988, S. MATSUMOTO leg. (NSMT–Ar 2036–2044).

Notes. This species resembles *Clubiona concinna* (THORELL, 1887) described from Burma and *C. yaginumai* HAYASHI, 1989, from Honshu, Japan, but differs from them in having a fig-shaped embolus of male palp and reniform spermathecae of female genitalia. *Clubiona concinna* possesses peculiar apophyses on the tibia of

male palp. These three species belong to the species-group of *C. corticalis*.

***Clubiona viridula* sp. nov.**

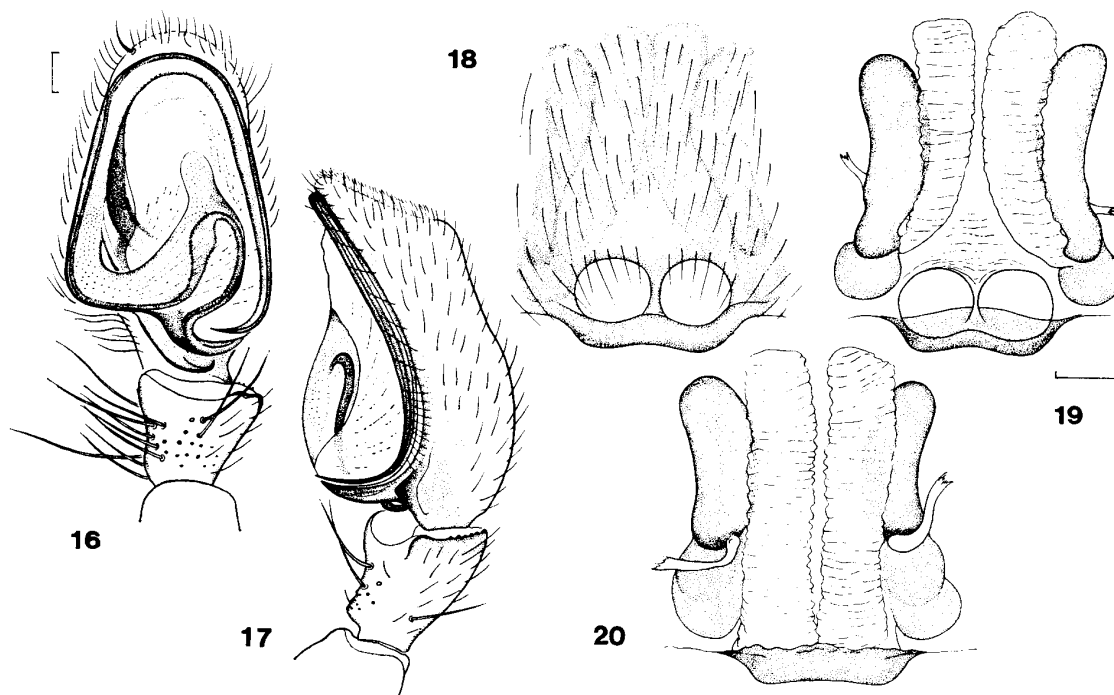
[Japanese name: Kusairo-fukurogumo]

(Figs. 16–20)

Measurements (in mm). Body length ♀ 4.81–5.56, ♂ 4.22–5.56; prosoma length ♀ 2.22–2.30, ♂ 2.00–2.54, width ♀ 1.41–1.63, ♂ 1.56–1.85; opisthosoma length ♀ 2.52–3.19, ♂ 2.44–3.04, width ♀ 1.41–1.85, ♂ 1.33–1.56; lengths of legs I–IV [total length (femur+patella+tibia+metatarsus+tarsus)]: ♀ (allotype), I 5.08 (1.63+0.81+1.26+0.93+0.45), II 5.55 (1.78+0.81+1.48+1.00+0.48), III 4.51 (1.30+0.70+0.96+1.11+0.44), IV 6.51 (1.81+0.74+1.59+1.85+0.52), ♂ (holotype), I 7.16 (2.04+1.04+2.04+1.41+0.63), II 7.71 (2.30+1.04+2.22+1.52+0.63), III 5.22 (1.52+0.67+1.11+1.48+0.44), IV 7.60 (2.15+0.89+1.78+2.22+0.56).

Prosoma. Eyes: ALE/AME ♀ 1.11–1.25, ♂ 1.25–1.33, PLE/PME ♀ 1.00–1.25, ♂ 1.00, AME–AME/AME–ALE ♀ 1.00–1.50, ♂ 1.50–2.00, PME–PME/PME–PLE ♀♂ 2.00–2.22. ♀♂ Chelicerae normal, with three teeth on promargin of fang furrow, two teeth on retromargin. Metatarsus I without spines; femur I with 0–1–1–1 dorsal spines.

Male palp (Figs. 16–17). Tibia setaceous; retrolateral apophysis very wide,



Figs. 16–20. *Clubiona viridula* sp. nov. — 16. Male palp, ventral view. 17. Same, retrolateral view. 18. Epigynum. 19. Female genitalia, ventral view. 20. Same, dorsal view. (Scales: 0.1 mm.)

serrated. Bulb without tegular apophysis; embolic division very long and winding around tegulum.

Female genitalia (Figs. 18–20). Epigynum sclerotized; intromittent orifices large, situated near epigastric furrow. Intromittent canal wide, long and soft; atrium globular smaller than spermatheca; spermatheca claviform.

Coloration and markings. ♀♂ Prosoma yellow to light green, chelicerae, maxillae, labium and palps light yellowish green, sternum and legs yellow to dark green. Opisthosoma white, yellow to greenish or reddish yellow, without any markings. Colour in fresh specimens deep green.

Type series. Holotype: ♂, allotype: ♀, Urauchi, Iriomotejima Island, Southwest Japan, 1–IV–1986, A. TANIKAWA leg. (NSMT–Ar 2045–2046); paratypes: 2 ♂♂, same data as for the holotype, 2 ♀♀ 3 ♂♂, same locality as for the holotype, 30–III–1987, 1 ♀ 2 ♂♂, s. l., 29–III–1989, 1 ♀, Funaura, same island, 25–VIII–1988, 1 ♀ 3 ♂♂, Funaura, 29–III–1989, 3 ♀♀ 4 ♂♂, Ôhara, 30–III–1986, 1 ♀, Ôtomi, 24–VIII–1988, A. TANIKAWA leg., 1 ♂, Urauchi, 18–VIII–1988, S. MATSUMOTO leg. (NSMT–Ar 2047–2054).

Notes. This new species has a close resemblance to some species known from the Australian Region, especially to *Clubiona convoluta* FORSTER, 1979, but is distinguished from the latter by the structure of male palp and female genitalia. In the Australian species, the tibial apophysis is long and slender and the spermatheca of female genitalia is globular.

***Clubiona insulana* sp. nov.**

[Japanese name: Shima-fukurogumo]

(Figs. 21–22)

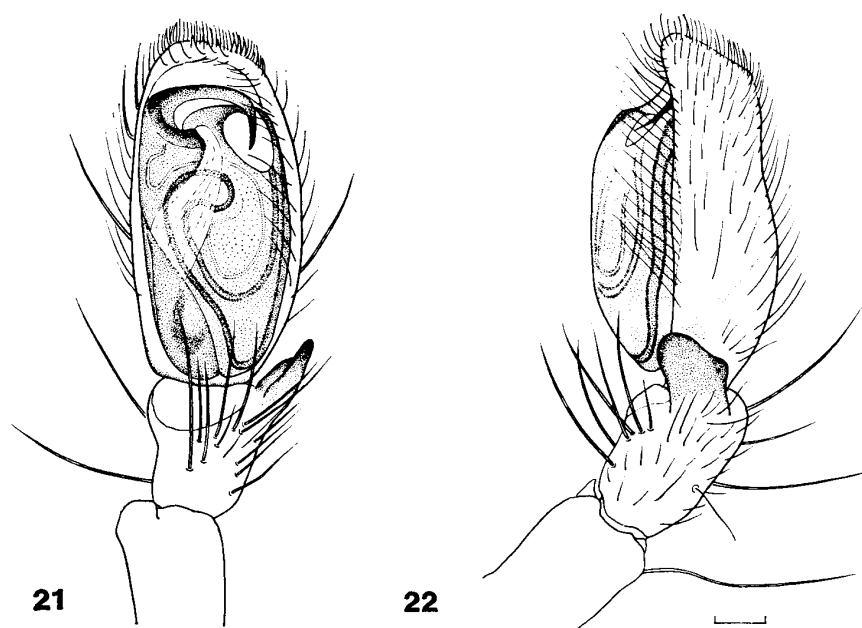
Measurements (in mm) (based on the male holotype). Body length 5.00; prosoma length 2.43, width 1.68; opisthosoma length 2.92, width 1.21; lengths of legs I–IV [total length (femur+patella+tibia+metatarsus+tarsus)]: I 6.24 (1.71+0.93+1.71+1.21+0.68), II 6.32 (1.75+0.93+1.71+1.25+0.68), III 5.11 (1.50+0.75+1.14+1.29+0.43), IV 7.28 (2.07+0.86+1.64+2.07+0.64).

Prosoma. Eyes equal in size, AME–AME/AME–ALE 1.14, PME–PME/PME–PLE 1.37. Chelicera normal; promargin of fang furrow with two teeth and several denticles, retromargin with two small teeth. Metatarsus I with 2–0–0 ventral spines; femur I with 1–1–1 dorsal spines.

Male palp (Figs. 21–22). Tibia with spines; retrolateral apophysis large and sclerotized, distally blunt. Tarsus long; bulb without distinct tegular apophysis, embolus spiniform and curved, the apical part on membranous conductor.

Coloration and markings. Prosoma and legs yellowish brown, chelicerae, maxillae and labium brown, palps and sternum yellow. Opisthosoma light reddish brown without distinct markings, ventral side yellow.

Type specimen. Holotype: ♂, Shirahama, Iriomotejima Island, Southwest Japan,



Figs. 21–22. *Clubiona insulana* sp. nov. — 21. Male palp, ventral view. 22. Same, retrolateral view. (Scale: 0.1 mm.)

27–XII–1987, A. TANIKAWA leg. (NSMT–Ar 2055).

Notes. The male palp of this new species has a typical construction of the species-group of *Clubiona trivialis* C. L. KOCH, 1843. The group is composed of a dozen of species widely distributed in the Holarctic Region. Of these, *C. diversa* O. PICKARD-CAMBRIDGE, 1862, distributed from Europe to Japan is closely related to *C. insulana*, but is distinguished from the latter by the shape of retrolateral apophysis on palpal tibia.

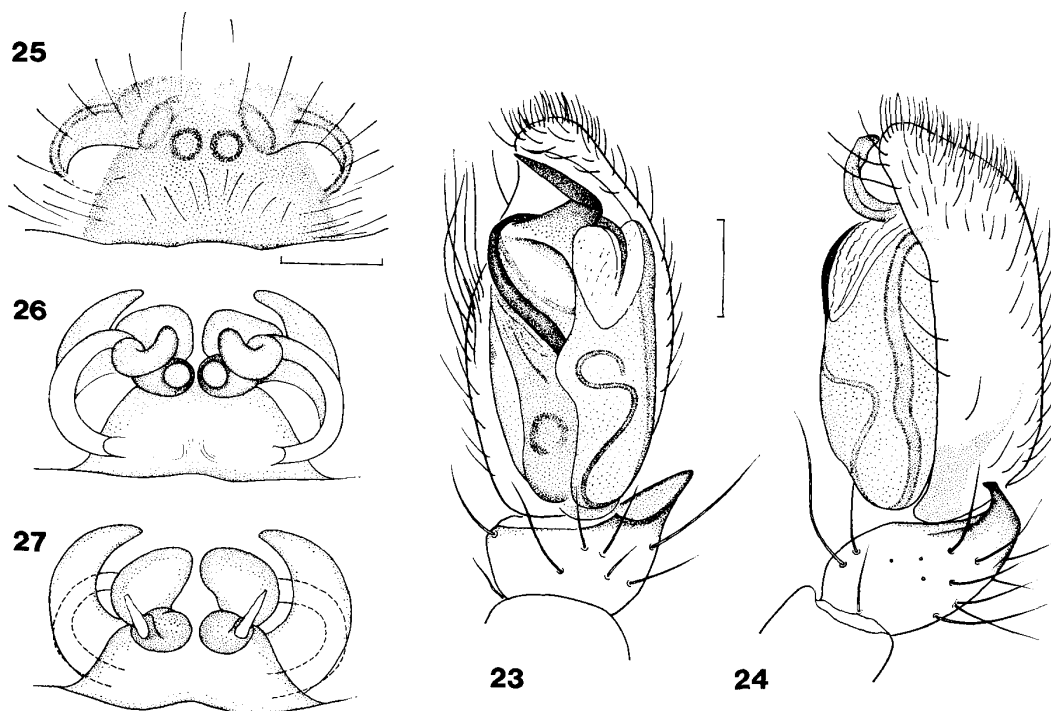
***Clubiona tanikawai* sp. nov.**

[Japanese name: Tanikawa-fukurogumo]

(Figs. 23–27)

Measurements (in mm). Body length ♀ 2.28–3.21, ♂ 2.14–2.79; prosoma length ♀ 1.07–1.36, ♂ 1.07–1.43, width ♀ 0.79–0.96, ♂ 0.78–1.00; opisthosoma length ♀ 1.21–1.79, ♂ 1.11–1.43, width ♀ 0.86–1.07, ♂ 0.71–0.92; lengths of legs I–IV [total length (femur+patella+tibia+metatarsus+tarsus)]: ♀ (allotype), I 1.98 (0.57+0.40+0.43+0.38+0.20), II 2.19 (0.67+0.40+0.50+0.40+0.22), III 1.85 (0.57+0.30+0.33+0.45+0.20), IV 2.78 (0.87+0.33+0.63+0.70+0.25), ♂ (holotype), I 2.14 (0.58+0.38+0.53+0.42+0.23), II 2.56 (0.77+0.47+0.62+0.45+0.25), III 2.15 (0.65+0.37+0.40+0.53+0.20), IV 2.97 (0.87+0.43+0.63+0.77+0.27).

Prosoma. Eyes subequal in size, ALE/AME ♀♂ 1.20–1.40, PLE/PME ♀♂ 1.00, AME–AME/AME–ALE ♀♂ 2.00–2.40, PME–PME/PME–PLE ♀♂ 1.75–2.33. Promargin of cheliceral fang furrow with one tooth and four denticles, retromargin



Figs. 23–27. *Clubiona tanikawai* sp. nov. — 23. Male palp, ventral view. 24. Same, retrolateral view. 25. Epigynum. 26. Female genitalia, ventral view. 27. Same, dorsal view. (Scales: 0.1 mm.)

with five denticles. Metatarsus I without ventral spines; femur I with 0–1–1–1 dorsal spines.

Male palp (Figs. 23–24). Tibia with weak setae; retrolateral apophysis spatulate. Tarsus long; tegular apophysis strongly sclerotized, apically pointed; embolus short, spiniform.

Female genitalia (Figs. 25–27). Epigynum wider than long, with a sclerotized plate and a pair of guide pockets. Intromittent canal short and curved; atrium reniform, larger than spermatheca; spermatheca small, globular, with a gland bacilliform.

Coloration and markings. Prosoma yellow to yellowish brown; chelicera, maxilla and labium brown, sternum, palps and legs light yellowish brown. Opisthosoma white to yellow without any marking. Male darker than female.

Type series. Holotype: ♂, allotype: ♀, Ôtomi, Iriomotejima Island, Southwest Japan, 29–III–1988, A. TANIKAWA leg. (NSMT–Ar 2056–2057); paratypes: 1 ♂, same locality as for the holotype, 24–VIII–1988, 1 ♂, s. l., 30–III–1989, 1 ♀, Ôhara, same island, 30–III–1989, 1 ♀, Komi, 31–XII–1988, 1 ♀ 1 ♂, Komi, 28–III–1989, 1 ♀, Shirahama, 23–VIII–1987, 1 ♂, Shirahama, 30–XII–1988, 1 ♂, Sonai, 1–I–1989, 1 ♀, Funaura, 29–XII–1988, A. TANIKAWA leg., 1 ♀, Komi, 18–VIII–1988, 1 ♂, Urauchi, 18–VIII–1988 S. MATSUMOTO leg. (NSMT–Ar 2058–2068).

Notes. This new species seems to belong to the species-group of *Clubiona zilla*

DÖNITZ et STRAND, 1906, in a broad sense (ONO, 1986 b). *Clubiona tanikawai* can be easily distinguished from *C. zilla*, the only member of the group previously known, by the structure of the male and female genital organs.

This species is dedicated to Mr. Akio TANIKAWA, Kanagawa.

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